

## STATIC ANALYSIS OF THE ECONOMIC EFFICIENCY OF INVESTMENTS IN AGRICULTURE IN THE REPUBLIC OF MOLDOVA

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### Abstract

Investments are the main “engines of economic growth”, as they represent powerful revenue-generating and job-creating resources.

In the national economic system, investments represent an accelerator that has the role of multiplying the inputs of material and labour resources, thus leading to an increase in agricultural productivity.

Under market economy conditions, the main source of financing investments is the money obtained as a result of the profit derived from the economic activity or other financial means.

The economic thinking has been concerned and continues to be concerned more and more with issues of economic efficiency, both in terms of approaching the concept and how to express and identify ways to increase the economic efficiency of different branches, including agriculture.

In this paper, the authors investigated dynamically the level of investments in agriculture, determined and analyzed the trend of change, the structure of financing according to the support measures, examined the factors that influence the tendency and the ability of the farmers to make investments. Also, there were determined the static indices in order to assess the economic efficiency and agricultural production of different enterprises situated in the North and Central Development Regions.

**Key words:** agrarian sector, investments, economic efficiency, profit, profitability.

The role of investments in the economic development of a country is particularly complex because they influence ownership structures, economic structures by branches and sub-branches, technological structures and employment.

The scientist P. Drucker considers the relationship between innovation, production, demand and market as follows: as innovation brings about changes in the structure of production, this in turn leads to changes in the structure of demand for goods and services, and these, in turn, bring about changes in the structure of markets, i.e. the emergence of new markets or new products (Drucker P., 1993).

P. Masse identifies four key elements of an investment:

1. The subject, represented by the investor (natural or legal person);
2. The object, representing the work, the enterprise, the company, the equipment, etc.; the way in which the investment is materialized;
3. The cost, representing the additional, actual and current effort consumed in order to obtain that particular object;

4. The value effects resulting from the implementation of investments, which is obtained in the future and represents in fact a more or less assured hope (Masse P., 1959).

In terms of competitive economy and existence of private property, investments represent the key to ensuring maximum efficiency through the highest possible impact on the unit of effort.

According to P. Drucker, investments represent the material basis of country's development. They ensure the quantitative and qualitative growth of fixed capital, the increase of technical and economic efficiency of the existing capital, but also the creation of new jobs. Due to investments, it is assured an increased use of material and labour resources of the society. We agree with the assertion that investments have a decisive role in ensuring the modernization of economic activity as a necessary condition of adapting the technical and economic systems of our country for participating in international economic relations under conditions of competition and competitiveness. Investments give rise to the so-called propagation effect or drive effect,

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which determines: promotion of technical progress, increase in productivity, improvement of goods quality and increase of economic efficiency (Drucker P., 1993).

Investments determine the economic growth because they create a new “economy”. The implementation of investment projects mainly leads to the increase of fixed capital accumulation. Thus, investments represent the main instrument for achieving economic modernization in all branches and sub-branches of national economy.

Investments are the main “engines of economic growth” as they represent powerful revenue generating and job creating resources. In the national economic system, investments represent an accelerator that has the role of multiplying inputs of material and labour resources, thus increasing the system’s outputs.

Specialized literature comes up with more concise definitions closely related to the linguistic meaning of the economic efficiency notion: “Efficiency is the attribute of any human activity meant to produce the desired effect” (Buhociu F., 2010).

The economic efficiency of investments seeks to achieve optimum results as a consequence of the effect-cost relationship. Efficiency highlights the direct relationships and links between financial and time resources on the one hand and the expected, anticipated advantages of each project or project variant and investment alternative, on the other hand.

Investment activity in the Republic of Moldova is regulated by the legislation in force. The first legal act stipulating the investment activity was the Foreign Investment Law no. 998 of 01.04.1992. The Government of the Republic of Moldova adopted the Decision on the investment strategy in the Republic of Moldova, which stipulated the activities related to the investment system:

- ensuring a favorable investment climate;
- attracting foreign and local investments;
- enterprise access to investment credits for the modernization of enterprises;
- promoting investment projects;
- creating a database on investment programs (Government Decision of the R.M.).

Several Strategies for Economic Development, which represent the supreme political framework for the sustainable development of the Republic of Moldova and also of the agricultural sector (in 2004, 2008 and 2014) have been developed and it was created the Bank for Development and Investment of the Republic Moldova and the National Agency for attracting investments. Agricultural sector’s activity is also

coordinated by a series of laws, decisions and programs meant to redress and streamline the activities within this sector (Government Decision of the R.M.).

## MATERIALS AND METHODS

The researches in the field of economic efficiency of investments in agriculture are based on data collected from the materials of the National Bureau of Statistics, the Agency for Interventions and Payments in Agriculture, the Ministry of Agriculture and Food Industry, the analytical data of the Ministry of Finance and the financial statements of the agricultural enterprises. The analysis performed in this paper used the following research methods and procedures: observation method, comparison method, grouping, table and graph method, analytical leveling of time series, etc.

## RESULTS AND DISCUSSIONS

The need to increase investments in agriculture is dictated particularly by the increasing demand for food products and the necessity to develop a sustainable agriculture. At the same time, these investments should not seek to promote an industrial agriculture but to use technologies that will favour the protection of environment, resources, agro-ecological and social equilibrium.

Private domestic investments play a dominant role in the agricultural sector investments, especially in the Republic of Moldova, which is a low and middle income country. Agricultural entities invest in order to increase or diversify their sources of income.

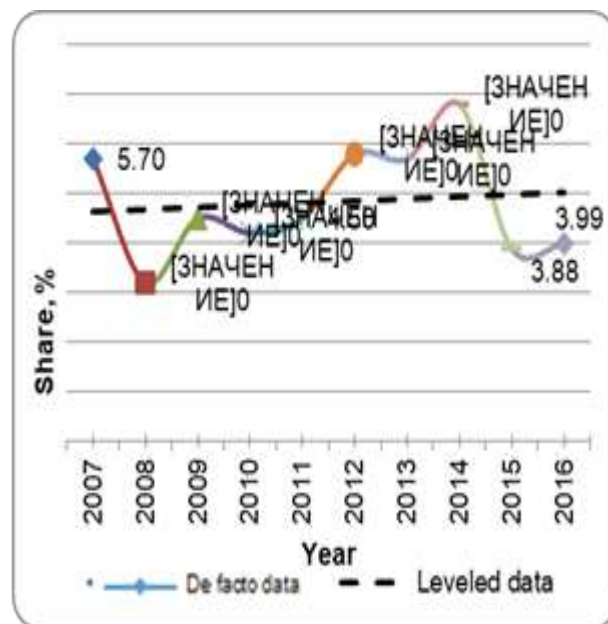


Fig.1. The evolution and trend of the investment share in the agricultural sector in the total amount of investments from the State Budget of the Republic of Moldova, in the period 2007 – 2016

In the period 2007-2016 (fig.1), essential changes took place in the share of agricultural investments made from the state budget of the Republic of Moldova. Thus, in 2008, this share decreased by 2.5 percentage points compared to 2007, followed by an increase of 1.3 percentage points in 2009, reaching the value of 6.8% in 2014 and a decrease in the years 2015-2016 down to 3.8-3.9% out of the total amount of state budget investments.

In order to assess the evolution trend of investments share in the agricultural sector out of the total investment funds made from the state budget, it was applied the statistical method of least squares of the following linear function type:  $y_t = a_0 + a_1 t$ , where  $a_0$  and  $a_1$  are the parameters of the equation,  $t$  - time (Timofti E., 2017).

The obtained results show that:  $y_t = 4,604 + 0,04t$ . On average, the share of investments in agriculture in the total amount of investments in the period 2007-2016 has an increasing trend only of 0.04% annually. This nonessential capital increase is not sufficient to halt the considerable depreciation of current assets.

The analysis of investment sources structure in the fixed capital by funding sources shows that the share of investments from the administrative-territorial budget constitutes 1.6%, foreign investments - 5.7% and other sources - 21.2%. The highest share is focused on the own means - within the range of 57-67%.

Under market economy conditions, the main source of financing investments is own financial means formed as a result of the profit obtained from the economic activity or other financial means. In most cases, own resources of the agricultural enterprises are insufficient to fund the necessary investments. Thus, they are obliged to use such resources as bank credits, deposits from founders or other sources of funding. It is obvious that the role of credits in funding investment projects is a positive one, contributing to the modernization of agricultural enterprises. But at the same time paying the interest rate represents a burden that reduces the economic efficiency of production during the repayment.

Over the period under review, there is a steady increase in other sources of financing investments. These changes represent the result of a precarious political situation in the Republic of Moldova in the last period. This situation also reduced the volume of investments destined for the

agricultural sector of the Republic of Moldova. However, despite existing impediments, the farmers continue to develop the agricultural sector investing in their own resources due to bank credits or through foreign investors. Total investments in fixed capital for the development of agriculture, as compared to other sectors of the national economy, doubled in the period 2007-2016 from 731.6 million MDL to 1801.8 million MDL.

Analyzing the share of financing according to the support measures in the period 2010-2016, we can see that the largest share is held by the Measure 5 "Stimulating investments for the procurement of agricultural machinery and equipment". This is due to the stringent need for the agricultural sector mechanization and automation using modern and efficient agricultural machinery and equipment. But in dynamics, the share of this measure has reduced by 20% in favour of other measures.

Among other measures to be taken into consideration we can mention the following: "Stimulating investments for establishing vine plantations", "Stimulating investments for stubbing out of perennial plantations", "Stimulating investments for establishing perennial plantations" and "Stimulating investments for anti-frost and anti-hail systems". Their share represents over 25%.

The share of Measure 6 "Stimulating investments for the technological renovation of the animal breeding farms" recorded an increase of about 7%. An absolutely new measure emerged in 2013, "Stimulating the consolidation of agricultural land". A considerable increase was recorded in the share of Measure 8 "Stimulating investments in the post-harvest and processing infrastructure" - by 20% - compared to 2010 and reached about 26% (AIPA Reports).

Investments in agriculture ensure an increased technical level of production by introducing new fixed assets (irrigation, machinery and tractors, vineyards, orchards etc.) required for development or modernization. Investments represent one of the ways of showing technical progress in agriculture that ensures reduced costs, economic growth and labour productivity. In order to identify the optimal level of investments (calculated per 1 ha) that can influence the achievement of their economic efficiency, the grouping of 55 agricultural enterprises was carried out according to the level of investments per 1 ha of agricultural land (Table 1).

Tabel 1

**The influence of the investment level per 1 ha in the selected enterprises of the Republic of Moldova  
on the increase of the investments' efficiency on average in the period 2012-2014**

Index	Groups of enterprises according to the investment level per 1 ha of agricultural land. MDL			
	I up to 1000	II 1001-3000	III over 3000	total. on average
The number of enterprises. units	17	19	19	55
The value of investments per 1 ha of agricultural land. MDL	557.2	1655.6	8664.8	2993
The value of global production per 1 ha. MDL	9538	11154	12996	11229
The value of agricultural production for 1 invested MDL. MDL	3.0	15.6	10.6	9.74

Source: (Timofte E., Șargo A., 2017)

Analyzing data presented in Table 1, we can note that the increase of investments per 1 ha of agricultural land leads to the increased effect, i.e. the value of agricultural production per 1 ha of agricultural land. In the Group III of enterprises this index constitutes 12996 MDL/ha, i.e. by 36.2% higher than in Group I and by 16.5% higher compared to Group II. However, investment profitability is higher in the Group II of enterprises - 15.6 MDL. This situation indicates that:

- the optimal level of investments per 1 ha of agricultural land is of 1655.6 MDL. Its further increase leads to a decrease in the investment profitability, i.e. by 32% of economic efficiency.
- the investments of 557.2 MDL applied on average per 1 ha of agricultural land are not enough and do not generate high results - the productivity of the agricultural land and of investments record a low level.
- the investments of 8664.8 MDL applied on average per 1 ha of agricultural land contribute to the increase of the global production value per 1ha of agricultural land, but the investment efficiency decreases, i.e. the investments in high amounts are not efficiently used.

The complexity and multitude of factors having a great influence on the investment decisions of agricultural enterprises should undergo an assessment regarding the efficiency of these investments over a longer period of time. Several categories of economic efficiency indices of investments are used in the economic practice.

Static indices for assessing economic efficiency vary in type, mode of expression,

information capacity and significance. Their numeric value varies according to the requirements of the analysis and of investors. These indices serve to form a global picture of the investment objective and offer a general characterization of the investment objective.

Under market economy conditions, one of the most important economic efficiency indices that characterizes enterprise performance is investment profitability. In order to make some conclusions about the efficiency of agricultural enterprises in the Republic of Moldova, we will carry out a dynamic analysis of this index. 22 agricultural enterprises were selected from the North and Central Development Regions of the country and their standard deviation and coefficient of investment variation were analyzed for the period 2010 - 2014 (some of them were included in Table 2)

The standard deviation was calculated according to the following formula:

$$\sigma = \sqrt{\frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n}} \quad (1)$$

While the coefficient of investment variation was calculated according to the following formula:

$$v = \frac{\sigma}{\bar{x}} * 100 \quad (2)$$

Tabel 2

**Investment profitability in some agricultural enterprises in the period 2010-2014**

Investment profitability in the agricultural enterprises, %										
Year	North Development Region						Central Development Region			
	6.06	16.42	7.84	9.88	31.48	13.98	64.87	20.75	24.13	14.76
2010	6.06	16.42	7.84	9.88	31.48	13.98	64.87	20.75	24.13	14.76
2011	7.45	5.81	11.1	2.05	53.81	10.8	15.74	39.85	41.13	12.27
2012	-7.44	14.7	54.13	1.61	59.1	16.16	22.13	26.64	41.35	10.68
2013	16.53	17.46	79.7	11.28	40.36	16.51	2.53	29.03	81.03	11.41
2014	5.3	5.74	16.15	6.63	28.62	18.44	26.64	18.46	31.69	12.54
The mean value. $\bar{x}$	5.58	12.02	33.78	6.29	42.67	15.17	26.38	26.94	43.86	12.33
Standard deviation. $\sigma$	7.65	24.75	28.35	3.94	12.01	2.6	20.88	7.50	19.66	1.37
Coefficient of variation. $\nu$	1.37	2.05	0.83	0.62	0.28	0.17	0.79	0.27	0.44	0.11

Source: elaborated by the authors based on the financial statements data offered by the agricultural enterprises

Analyzing investments profitability in those 22 agricultural enterprises situated in the North and Central Development Regions (Table 2) we can state that the coefficient of variation ranges from 0.17 to 2.05 for the enterprises situated in the North region and from 0.11 to 0.79 for the enterprises situated in the Central region. We note that the highest value of enterprise profitability over the analyzed period was recorded by „Tavgam Com” Ltd. (43.86%). „Micmarim” Ltd. (42.67%) and „Curtea dacilor” Ltd. (33.78%). Among the enterprises recording the lowest profitability we can mention „Agrolivteh” Ltd. (5.58%) and „Taras-Scop-Agro” Ltd. (6.29%) situated in the North region and „Biagrolivest” Ltd. (6.56%) situated in the Central region. These indices prove that the analyzed agricultural enterprises have managed to recover their investments during this period.

Examining the evolution of the investment profitability index in the analyzed agricultural enterprises, we can conclude that although the profitability level is higher in the Central region, this index had an upward trend especially in the enterprises situated in the North region except for the year 2012 (unfavorable year). In 2014, this index has a downward trend in both agricultural regions.

## CONCLUSIONS

1. Traditionally, in the Republic of Moldova, investment funding was based on internal resources. The difficulties related to the legalization of foreign investments in the conditions of economic and political instability allow assuming that in the future a decisive

role in financing investments will be played by the internal sources, regardless of the active foreign capital allocation in the last years.

2. On average, the share of investments in agriculture in the total amount of investments in the period 2007-2016 has an increasing trend only by 0.04% annually.
3. The increase of investments per 1 ha of agricultural land leads to the increase of the effect, i.e. the value of agricultural production per 1 ha of agricultural land. The optimal investment level per 1 ha of agricultural land is of 1655.6 MDL. Its further increase leads to a decrease of 32% in investment profitability, i.e. in the economic efficiency.
4. Analyzing the level of investment profitability in agricultural enterprises by development regions it could be concluded that for 1 MDL consumed investments the enterprises can obtain a profit of 33,7- 43,8 MDL, although a part of the enterprises obtain a low profitability or are not profitable at all. Research shows that the enterprises situated in the North Development Region are more efficient in using investments and that they have a higher volume of investments than the enterprises situated in other development regions.
5. It was suggested that the agricultural enterprises implement in their practical activity the following investment techniques and measures:
  - organizing the activity of the agricultural sector in association within the IFAD program;
  - creating agricultural clusters within the high added-value sectors (horticultural

sector, vegetable cultivation in protected environment, animal breeding) as a form of collaboration between agricultural enterprises, research institutions, input providers and final customers;

- promoting sustainable development through conservation agriculture (“Mini-Till” and “No-Till” technologies);
- switching to Precision Farming and Smart Agriculture;
- implementing E-Agriculture;
- promoting extensive ecological agriculture.

## REFERENCES

- Anuarul Statistic 2007-2016*. Available on-line: at [http://www.statistica.md/public/files/serii\\_de\\_timp/investitii\\_capital\\_fix/investitii\\_capital\\_fix/17.1.7.xls](http://www.statistica.md/public/files/serii_de_timp/investitii_capital_fix/investitii_capital_fix/17.1.7.xls)
- Buhociu F., 2010.** Investiții. Galați: Editura EUROPLUS, 97p.
- Drucker P., 1993.** Inovația și sistemul antreprenorial. București: Editura Enciclopedică. 189 p.
- Hotărârea Guvernului Republicii Moldova Nr. 1288 din 09 noiembrie 2006 cu privire la aprobarea Strategiei de atragere a investițiilor și promovare a exporturilor pentru anii 2006-2015.* În: Monitorul Oficial al Republicii Moldova nr. 181-183 din 24 noiembrie 2006.
- Hotărârea Guvernului Republicii Moldova Nr. 409 din 04 iunie 2014 cu privire la aprobarea Strategiei Naționale de Dezvoltare Agricolă și Rurală pentru anii 2014-2020.* În: Monitorul Oficial al Republicii Moldova nr. 152 din 10 iunie 2014.
- Hotărârea Guvernului Republicii Moldova Nr. 282 din 11 martie 2008 cu privire la aprobarea Strategiei Naționale de Dezvoltare Durabilă a Complexului Agroindustrial al Republicii Moldova pentru anii 2008-2015.* În: Monitorul Oficial al Republicii Moldova nr. 57-60 din 21 martie 2008.
- Masse P., 1959.** Le choix des investissements. Critères et méthodes. Finance et économie appliquée, volume VI. Paris, Dunod, XVI p. 489 p.
- Rapoarte privind executarea bugetului de stat pe anii 2007- 2014*, Ministerul de Finanțe. Available on-line at : <http://www.mf.gov.md/reports>
- Rapoarte ale Agenției de Intervenții și Plăți în Agricultură.* Available on-line at : <http://www.aipa.md>
- Timofti E., Șargo A., 2017.** *Management of enhancing the efficiency of investment use in the agricultural sector from the Republic of Moldova.* În: Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development Vol. 17, Issue 2, PRINT ISSN 2284-7995, E-ISSN 2285-3952, pag.365-370.
- Timofti E., Șargo A., 2017.** *Dezvoltarea și creșterea economică a agriculturii în contextul procesului investițional (Aspecte teoretico-practice).* Monografie. Chișinău: Editura Print-Caro. 202 p.